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Brief Report

Treatment with Rutin - A Therapeutic Strategy for Neutrophil-Mediated Inflammatory and Autoimmune Diseases

- Anti-inflammatory Effects of Rutin on Neutrophils -

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Key Words
human neutrophils, myeloperoxidase, nitric oxide, rutin, tumor necrosis factor-α

Abstract

Objectives: Neutrophils represent the front line of human defense against infections. Immediately after stimulation, neutrophilic enzymes are activated and produce toxic mediators such as pro-inflammatory cytokines, nitric oxide (NO) and myeloperoxidase (MPO). These mediators can be toxic not only to infectious agents but also to host tissues. Because flavonoids exhibit antioxidant and anti-inflammatory effects, they are subjects of interest for pharmacological modulation of inflammation. In the present study, the effects of rutin on stimulus-induced NO and tumor necrosis factor (TNF)-α productions and MPO activity in human neutrophils were investigated.

Methods: Human peripheral blood neutrophils were isolated using Ficoll-Hypaque density gradient centrifugation coupled with dextran T500 sedimentation. The cell preparations containing > 98% granulocytes were determined by morphological examination through Giemsa staining. Neutrophils were cultured in complete Roswell Park Memorial Institute (RPMI) medium, pre-incubated with or without rutin (25 μM) for 45 minutes, and stimulated with phorbol 12-myristate 13-acetate (PMA). Then, the TNF-α, NO and MPO productions were analyzed using enzyme-linked immunosorbent assay (ELISA), Griess Reagent, and MPO assay kits, respectively. Also, the viability of human neutrophils was assessed using tetrazolium salt 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT), and neutrophils were treated with various concentrations of rutin (1 - 100 μM), after which MTT was appended and incubated at 37°C for 4 hour.

Results: Rutin at concentrations up to 100 μM did not affect neutrophil viability during the 4-hour incubation period. Rutin significantly decreased the NO and TNF-α productions in human peripheral blood neutrophils compared to PMA-control cells ($P < 0.001$). Also, MPO activity was significantly reduced by rutin ($P < 0.001$).

Conclusion: In this *in vitro* study, rutin had an anti-inflammatory effect due to its inhibiting NO and TNF-α productions, as well as MPO activity, in activated human neutrophils. Treatment with rutin may be considered as a therapeutic strategy for neutrophil-mediated inflammatory/ autoimmune diseases.

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